AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS

1. (Currently Amended) Detector of incident ionizing radiation ~~(16)~~ constituted of primary particles, this detector being characterised in that it comprises:

- layers ~~(6)~~ of a semiconducting composite material comprising a host matrix made of a polymer and guest particles of the semiconductor type dispersed throughout the host matrix, at least these guest particles being capable of interacting directly or indirectly with the radiation, electric charges being produced in the layers of the composite material from the interaction of the guest particles with the radiation,

- means ~~(22-26)~~ for creating an electric field in the layers of composite material, the host matrix being capable of transporting the electric charges under the action of this electric field and thus making it possible to exploit these electric charges, and

- a stack of sheets ~~(4)~~ of a first material which is capable of emitting secondary particles by interaction with the incident ionising radiation, the layers of composite material alternating with the sheets of the first material and being able to be ionized by the secondary particles, each of the layers being associated with one of the sheets,

the stack having first ~~(8)~~ and second ~~(10)~~ opposite faces, each containing respective edges of sheets and layers, the detector being intended to be oriented such that the ionizing radiation arrives on the first face, the length of each sheet, counted from the first to the second face, being at least equal to the tenth of the mean free path of the

primary particles in the first material, the means for creating the electric field comprising, for each layer, a group of parallel and electrically conductive tracks ~~(22)~~ which extend from the first to the second face, parallel to this layer, and which are in contact with it, the tracks also being intended to collect the charges produced in this layer by interaction between it and the secondary particles and possibly with the primary particles and which are representative, in intensity and in position, of the primary particles, the electric field also being capable of provoking the collection of charges by the tracks.

2. (Original) Detector according to claim 1, in which the polymer is chosen from the group comprising semiconducting polymers and electrically insulating polymers.

3. (Currently Amended) Detector according to claim 1, in which the mobility of the electric charges in the polymer is greater than 10^{-6} $\underline{cm^2/V/s}$ ~~$cm^2/V/sec$~~.

4. (Original) Detector according to claim 3, in which the polymer is chosen from the group comprising polyphenylenevinylene, polythiophene, polyaniline, polypyrrol and polydiacetylene.

5. (Previously Presented) Detector according to claim 1, in which the guest particles are capable of producing electric charges by direct interaction with the incident radiation or by interaction with other electric charges produced by interaction of this incident radiation with the host matrix.

6. (Previously Presented) Detector according to claim 1, in which the guest particles are chosen from the group comprising grains of at least one semiconductor powder and semiconducting colloidal particles.

7. (Currently Amended) Detector according to claim 1, in which the guest particles have a mean atomic number higher than 14, an average density greater than 2 $g.cm^{-3}$ ~~$gm.cm^{-3}$~~ and an average relative permittivity greater than 10.

8. (Previously Presented) Detector according to claim 1, in which the guest particles are coated in a material preventing agglomeration of these guest particles.

9. (Currently Amended) Detector according to claim 1, in which the first material is electrically conductive, the tracks ~~(22)~~ are electrically insulated from the sheets ~~(4)~~ and the means for creating the electric field furthermore comprise means ~~(26)~~ for applying an electric voltage between the tracks and the sheets, this voltage being able to provoke collection of charges by the tracks.

10. (Currently Amended) Detector according to claim 1, in which each group of tracks ~~(22)~~ is contained in the layer ~~(6)~~ with which it is associated.

11. (Currently Amended) Detector according to claim 10, in which the first material is electrically conductive and ~~that furthermore~~ the means for creating the electric field

further comprise means ~~(26)~~ for applying an electric voltage between the tracks and the sheets, this voltage being able to provoke collection of charges by the tracks.

12. (Currently Amended) Detector according to claim 1, in which the sheets ~~(4)~~ are electrically insulating, an electrically conductive layer ~~(46)~~ is interposed between each layer of composite semiconducting material and the sheet associated with it and the means of creation of the electric field furthermore comprise means ~~(26)~~ for application of an electric voltage between the tracks ~~(22)~~ and the electrically conductive layers ~~(46)~~, this voltage being capable of provoking the collection of charges by the tracks.

13. (Original) Process for manufacturing the detector according to claim 11, in which a first thickness of composite material is formed on each sheet and then the tracks are formed on this first thickness and then a second thickness of composite material is formed on the first thickness so as to cover the tracks, and then the sheets are stacked so as to obtain alternate sheets and layers.

14. (Original) Process for manufacturing the detector according to claim 11, in which, on two opposite faces of two successive sheets, a half-layer of composite material is deposited, then the group of tracks is formed on one of the half-layers, and then the sheets are stacked in such a way as to obtain alternate sheets and layers.

15. (Currently Amended) Detector according to claim 2, in which the mobility of the electric charges in the polymer is greater than 10^{-6} $cm^2/V/s$ ~~$cm^2/V/sec$~~.

16. (Previously Presented) Detector according to claim 4, in which the guest particles are capable of producing electric charges by direct interaction with the incident radiation or by interaction with other electric charges produced by interaction of this incident radiation with the host matrix.

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17. (Previously Presented) Detector according to claim 5, in which the guest particles are chosen from the group comprising grains of at least one semiconductor powder and semiconducting colloidal particles.

18. (Currently Amended) Detector according to claim 6, in which the guest particles have a mean atomic number higher than 14, an average density greater than 2 $\underline{g.cm^{-3}}$ ~~gm.cm^{-3}~~ and an average relative permittivity greater than 10.

19. (Previously Presented) Detector according to claim 7, in which the guest particles are coated in a material preventing agglomeration of these guest particles.

20. (Currently Amended) Detector according to claim 8, in which the first material is electrically conductive, the tracks ~~(22)~~ are electrically insulated from the sheets ~~(4)~~ and the means for creating the electric field furthermore comprise means ~~(26)~~ for applying an electric voltage between the tracks and the sheets, this voltage being able to provoke collection of charges by the tracks.

21. (Currently Amended) Detector according to claim 8, in which each group of tracks ~~(22)~~ is contained in the layer ~~(6)~~ with which it is associated.

22. (Currently Amended) Detector according to claim 8, in which the sheets ~~(4)~~ are electrically insulating, an electrically conductive layer ~~(46)~~ is interposed between each layer of composite semiconducting material and the sheet associated with it and the means of creation of the electric field furthermore comprise means ~~(26)~~ for application of an electric voltage between the tracks ~~(22)~~ and the electrically conductive layers ~~(46)~~, this voltage being capable of provoking the collection of charges by the tracks.